

Patricia M. French  
Senior Attorney



300 Friberg Parkway  
Westborough, Massachusetts 01581  
(508) 836-7394  
(508) 836-7039 (facsimile)  
[pfrench@nisource.com](mailto:pfrench@nisource.com)

May 31, 2005

BY OVERNIGHT DELIVERY AND E-FILE

Mary L. Cottrell, Secretary  
Department of Telecommunications and Energy  
One South Station  
Boston, MA 02110

Re: Bay State Gas Company, D.T.E. 05-27

Dear Ms. Cottrell:

Enclosed for filing, on behalf of Bay State Gas Company ("Bay State"), please find Bay State's responses to the following information requests of the Department:

|          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|
| DTE-4-2  | DTE-4-4  | DTE-4-5  | DTE-4-7  | DTE-4-8  | DTE-4-13 |
| DTE-4-19 | DTE-4-22 | DTE-4-23 | DTE-4-26 | DTE-4-27 | DTE-4-32 |
| DTE-4-33 | DTE-4-37 | DTE-4-39 | DTE-4-53 | DTE-4-54 | DTE-4-57 |

Please do not hesitate to telephone me with any questions whatsoever.

Very truly yours,

Patricia M. French

cc: Caroline O'Brien Bulger, Esq., Hearing Officer (1 copy)  
A. John Sullivan, DTE (7 copies)  
Andreas Thanos, Ass't Director, Gas Division  
Alexander Cochis, Assistant Attorney General (4 copies)

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
FOURTH SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: May 31, 2005

Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-2 Refer to Exh. BSG/LRK-2. If the gas utility industry is a capital intensive industry, explain the reasons for conducting a cost trend analysis and an econometric cost study for Bay State based on O&M costs only, and not including capital costs. To what extent do the cost trend analysis and the econometric cost study give a complete analysis/overview (as opposed to a partial analysis/overview) of the overall cost performance of Bay State during the study period?

Response: The Bay State cost study focused only on O&M costs in order to respond to concerns the Department raised in DTE 03-40. The Department's main concern with the econometric study I presented in that case pertained to capital "vintaging," or controlling for differences in the vintage of capital additions that are reflected in the 1983 "benchmark" capital stock measure. The Department concluded that our econometric methods did not control adequately for differences in capital vintaging or plant age. However, the only way to control perfectly for differences in plant age is to know the entire pattern of capital additions that is manifested in the benchmark capital stock for each sampled distributor. This did not prove to be feasible. Therefore, the only way to ensure that the Department's concerns with capital "vintaging" would be satisfied was to eliminate capital costs from the measure of gas distribution cost being benchmarked.

Nevertheless, focusing on O&M costs still provides a good and nearly complete evaluation of utility managers' cost performance. The reason is that utility capital costs are mostly "sunk." Most such costs reflect capital investment decisions that were made in the (often distant) past and which current managers cannot undo. The main cost components that current managers can actually control and "target" for efficiency gains are therefore O&M costs. Accordingly, most of the incremental efficiency gains that may be achieved during the term of a PBR plan will result from O&M cost savings. The Department has set values for consumer dividends by considering the potential for incremental efficiency gains that may be achieved during the term of an upcoming PBR plan. Benchmarking O&M costs is therefore relevant for considering appropriate consumer dividends for Bay State.

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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-4 Refer to Exh.BSG/LRK-2. Regarding the time series data used in the cost analysis ("cost trend" and "econometric cost" analyses), please:  
(a) explain why the Company did not include the test year 2004;  
(b) explain why the Company chose the time series 1994-2003;  
(c) explain why the "cost trend analysis" performed by the Company covers a different period of time from the period used in the econometric cost analysis;  
(d) explain why the Company did not consider the time series 1993-2004 for its entire cost analysis;  
(e) did the Pacific Economic Group ("PEG") perform the econometric cost analysis presented in Boston Gas Company Company, DTE 03-40 using the time series 1993-2000? Why did the Company not consider the year 1993 in the present econometric cost study?

Response: (a) Bay State's 2004 cost data were not available in time to include in the empirical analyses.

(b) The sample period was chosen to be 1994-2003 so that there would be an equal number of years before and during Bay State's rate freeze. In DTE 03-40, the cost trend and econometric cost analyses similarly featured equal numbers of years before and during Boston Gas's PBR plan.

(c) The cost trend and econometric analyses cover the same period. However, since the cost trend analysis involves the computation of trends, it is necessary to consider the 1993 observation to compute the change in O&M costs for 1994. The cost trend analysis therefore considers 10 cost (percentage) change observations; the econometric analysis considers 10 years of data for all sampled distributors.

(d) Please see the responses to parts (a) and (b).

(e) Yes. The econometric cost study did not consider 1993 data because we wanted to use the same sample periods for the cost trend and econometric analyses, and the cost trend analysis used cost trend observations for 1994-2003.

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DTE-4-5 Refer to Exh.BSG/LRK-2. Regarding the econometric cost modeling:  
(a) did the Company detect any structural change in the data for any of the gas distributors in the sample? Did the Company perform any test for structural change?  
(b) specifically, did the Company test for any structural change in Bay State data? If yes, please present the results. If no, please explain why not;  
(c) how did the Company account for Bay State's rate freeze period?  
(d) the Company concluded that Bay State's O&M cost grew by 3.9% per annum on average over the 1993-98 period and that the O&M cost declined by an average of 2.2 % per annum over the 1999-2003 period (see p. 9 of Exh.BSG/LRK-2). Based on these findings, would the Company conclude that there has been a cost trend change for Bay State?  
(e) explain how the Company captured the cost trend change detected in the "cost trend" analysis and how that cost trend change is linked to the setting of the consumer dividend.

Response: (a) We did not test for or detect structural change for any of the gas distributors in the sample.

(b) We did not test for structural change for Bay State Gas. In the present context, "structural change" refers to differences in parameters for different subsets of the sample period. Different cost function parameters would, in turn, imply that there was a distinct break in the underlying gas distribution technology. We had no reason to believe that such a fundamental change in the underlying technology occurred during our sample period.

(c) We "accounted for" Bay State's rate freeze period by examining Bay State's cost performance over the exact period for which the freeze was in effect (1999-2003).

(d) I believe these findings are consistent with a change in Bay State's O&M cost trend.

(e) We investigated an econometric specification that included a separate time trend variable for Bay State Gas for the rate freeze years. The coefficient on this variable was not statistically significant so it was not included in the final model.

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DTE-4-7 Refer to Exh.BSG/LRK-2 at 13. The Company states that a short run cost function was specified and that economic theory was used to guide the development of the cost model. In this regard, please explain the following:

- (a) why was the Company interested in estimating a short run cost function and not a long run?
- (b) define short run cost function and long run cost function;
- (c) what input has the Company considered to be constant in the short run? Is that input represented in the right hand side of the cost function equation? If not, why not.

Response:

- (a) Please see the response to DTE-4-2.
- (b) A short-run cost function is a cost function where a measure of variable cost is the dependent variable. A long-run cost function is a cost function where total cost is the dependent variable.
- (c) Capital is fixed (constant) in the short run. As discussed in BSG/LRK-2, our econometric work considered capital stock measures as independent variables, but these variables were not statistically significant and therefore not included in the final econometric specification. However, the system age proxy we employed was statistically significant and therefore included in the econometric model. Our "system age" variable is both a proxy for the fixed capital input and a metric that responds directly to the concerns the Department raised in DTE 03-40.

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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-8 Refer to Exh.BSG/LRK-2, at 13 wherein the Company defines the equation [1]. In that equation, the Company included the efficiency factor: "Ln efficiency" term. Please:

- (a) explain what kind of efficiency the Company refers to (i.e., productive efficiency, allocative efficiency, technological change);
- (b) discuss the meaning of having an efficiency factor ("Ln efficiency") equal to zero, positive or negative;
- (c) assume that the efficiency factor is negative. Please explain under which circumstances the actual cost of the Company could be less than the theoretical minimum.

Response:

- (a) "Efficiency" here refers to productive efficiency, or the extent to which the company's actual cost approaches the minimum possible cost given current technology. Technological change will reduce minimum cost but will only affect a company's measured "efficiency" if the company's actual costs do not fall by the same amount in response to technological change as the amount by which technical change reduces minimum cost.
- (b) An efficiency factor equal to zero implies the company is producing at minimum cost. A positive efficiency factor means the company is producing above minimum cost. It is not possible to have a negative efficiency factor.
- (c) It is not possible for the actual cost of the Company to be less than the theoretical minimum.

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DTE-4-13      Refer to Exh.BSG/LRK-2, at 6. The Company states that Bay State faces high prices for labor services. Please discuss with respect to what or whom the Company is comparing Bay State's labor prices.

Response:      In this statement, Bay State's labor prices are compared to the average for the US sample.

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- DTE-4-19 Refer to Exh. BSG/LRK-2, at 15. The Company assumes that the error term of the cost equation ("equation [3]") is random and that it includes two components: the error term of the minimum total cost function and the Company's efficiency factor differential from the sample norm. In this regard, please:
- (a) indicate if the following expression is correct:  
 $e = u + (\ln \text{efficiency} - \ln \text{efficiency}^{\text{average}})$
- (b) if yes, please discuss how the Company distinguishes between the term "u" and the term " $(\ln \text{efficiency} - \ln \text{efficiency}^{\text{average}})$ " as responsible for the variation in "e" (or the difference between the predicted cost and the actual cost).

Response:

- a) The expression is correct.
- b) To see how our econometric model distinguishes between "u" and the "efficiency" terms, consider the simplified version of our cost model given by:

$$C_{it} = \beta_o + X_{it} \beta + \eta_{it} \quad i = 1 \dots N, t = 1 \dots T$$

where  $\eta_{it} = \mu_i + \varepsilon_{it}$

Here,  $i$  denotes the  $N$  cross sections (firms),  $t$  the  $T$  time periods,  $C$  denotes cost,  $X$  is the matrix of independent business conditions or "cost drivers,"  $\beta$  is the model's estimated parameter vector and  $\eta$  is the error term of the regression that incorporates pure random noise,  $\varepsilon_{it}$ , and an unobserved measure of the firm's cost efficiency  $\mu_i$ . Note that the cost efficiency measure varies by firm  $i$  but not by time  $t$ .

Following estimation of the model's parameters, we obtain predicted cost as  $\hat{C}_{it} = \hat{\beta}_o + X_{it} \hat{\beta}$ . This is our estimate of firm  $i$ 's cost at time  $t$  given its business conditions. The error term is given by

$$\hat{\eta}_{it} = C_{it} - (\hat{\beta}_o + X_{it} \hat{\beta}).$$

This term, also referred to as the fitted residual, is composed of the efficiency term as well as pure random noise at any given point in time



$t$ . According to the classical regression model, the pure random element of the composed error term is zero on average, or  $E(\varepsilon_{it}) = 0$ . In order to isolate the efficiency measure component of the fitted residual, we therefore average the fitted residual of each firm over time, such that

$$E(C_{it}) - E(\hat{C}_{it}) = E(\hat{\eta}_{it}) = E(\hat{\mu}_i) + E(\hat{\varepsilon}_{it}) = E(\mu_i) \text{ since } E(\hat{\varepsilon}_{it}) = 0.$$

The term that remains in our multi-year cost evaluation is therefore the measure of the firm's relative efficiency (*i.e.* In efficiency - In efficiency<sup>average</sup>), not the random error term.

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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-22      Refer to Exh. BSG/LRK-2. Please indicate whether the cost trend analysis and the econometric cost study for Bay State controlled for the NiSource merger/acquisition-related savings. If not, explain? Also, explain what effect, if any, that the failure to control for the NiSource merger/acquisition-related savings would have on the results of the cost trend analysis and the econometric cost study for Bay State, and on the conclusions regarding the Company's cost performance during the study period.

Response:      The empirical analyses did not control for the NiSource merger. This is appropriate, because this event is not exogenous or beyond managerial control. Indeed, because the merger coincides with the rate freeze period, it was important not to "control" for such an event when assessing how the rate freeze PBR plan impacted Bay State's cost trends. This is analogous to the cost trend analysis undertaken for Boston Gas before and after its PBR plan was implemented.

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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-23      Refer to Exh. BSG/LRK-2. Please list all the implicit and explicit assumptions underlying the cost trend analysis and the econometric cost study for Bay State. Discuss how a violation of each assumption could affect the results of the cost trend analysis and the econometric cost study and the conclusions regarding the Company's cost performance during the study period.

Response:      The cost trend analysis was designed to replicate the analysis the Department asked Boston Gas to perform in DTE 03-40. Implicitly, the Department appeared to assume that examining a utility's cost performance under a just-expired PBR plan can provide evidence on that company's ability to achieve additional efficiency gains during the term of the next PBR plan (DTE 03-40 at 481). The Department also appeared to assume that, if there is a demonstrable change in O&M cost trends before and after PBR is implemented, it is possible to infer cause and not mere coincidence as the basis for such a change.

An implicit assumption of the econometric cost study is that rigorous econometric estimation can provide a reliable inference on Bay State's O&M cost performance relative to the average performance in the US gas distribution industry. Explicit assumptions of the econometric study are that the specified cost function is monotonic, concave, and linearly homogeneous in input prices. These are sometimes known as "regularity conditions." We tested for these conditions in our econometric model and found that they were satisfied.

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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-26 Refer to Exh. BSG/LRK-2. Please:  
(a) indicate the cost to Bay State to conduct the Cost Trend Analysis. Show how the cost to conduct the study was calculated, with all supporting documentation;  
(b) indicate the cost to Bay State to conduct the econometric cost study. Show how the cost to conduct the study was calculated, with all supporting documentation.

Response:

- (a) The cost trend analysis was not a separately enumerated task but was conducted as part of our general PBR consulting to Bay State. It is not possible to calculate the costs of conducting this study precisely, but I estimate they were between \$2000 and \$3000, including writing up the results and preparing tables for testimony.
- (b) The cost of the econometric study was \$100,000. The attached document (Attachment DTE-4-26) shows how the cost of the study was calculated. The final cost to Bay State was rounded down to \$100,000 and therefore differs slightly from this estimate.

| Hours                                     |           |           |           |           |           |                |        |
|---|-----------|-----------|-----------|-----------|-----------|----------------|--------|
|   | <u>ML</u> | <u>LK</u> | <u>DH</u> | <u>LG</u> | <u>SF</u> | <u>Interns</u> |        |
| Check GasDat                              |           |           | 1         | 5         |           | 5              |        |
| Update data                               |           |           |           |           |           |                |        |
| GasDat                                    |           |           |           | 5         |           |                |        |
| Contact cos.                              |           |           |           | 10        |           | 60             |        |
| Cross check sources,<br>finalize database |           |           | 5         | 40        |           | 40             | 120    |
| Check vintaging issue                     |           |           | 10        |           |           |                |        |
| Update Capital/new proxies                |           |           |           |           |           |                |        |
| Theory                                    |           |           | 15        | 5         | 5         |                |        |
| Methods                                   |           |           |           | 20        |           | 10             | 30     |
| Assemble data                             |           |           |           |           |           |                |        |
| Company start dates                       |           |           | 5         | 5         |           | 20             | 40     |
| N growth main cities                      |           |           | 5         | 5         |           | 30             | 60     |
| Update TWA index                          |           |           | 5         | 5         |           | 5              |        |
| Finalize Bay State data                   |           |           | 5         | 20        |           | 20             | 10     |
| Econometric specs.                        |           |           |           |           |           |                |        |
| Update                                    |           |           | 15        |           | 40        |                |        |
| New variables                             |           |           | 20        |           | 40        |                |        |
| Write up report                           |           | 5         | 30        |           |           |                |        |
| Total Hours                               |           | 5         | 116       | 120       | 85        | 190            | 260    |
| Total costs                               | 1250      | 26100     | 19200     | 13600     | 20900     | 20800          | 101850 |

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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-27 Refer to Exh. BSG/LRK-2. Please:  
(a) explain how the consumer dividend factor was determined for Boston Gas Company in D.T.E. 03-40;  
(b) discuss any similarities and differences between how the consumer dividend factor was determined for Boston Gas Company in D.T.E. 03-40 and how it has been determined for Bay State in the instant proceeding. In particular, show how the results of (i) the Cost Trend Analysis and (ii) the Econometric Cost Study were used to determine the consumer dividend factor in the price cap formula for Bay State.

Response:

- (a) As explained in DTE 03-40 at 480-481, the Department viewed the consumer dividend as "future" productivity factor intended to reflect expected future gains in productivity due to the move from cost of service regulation to PBR. Predicting "expected future gains in productivity" due to the stronger incentives of PBR is difficult. In assessing whether the consumer dividend proposed by Boston Gas in DTE 03-40 was appropriate, the Department essentially took a two-step approach. First, it evaluated the company's performance under the expired PBR plan. Next, it assessed what that evidence said about the company's potential for achieving additional productivity gains during the term of the next PBR plan.
- (b) A 0.3% consumer dividend was approved for Boston Gas in DTE 03-40. The Department's first step in determining this value was to examine Boston Gas's cost performance in its first PBR plan. In this regard, one of the key pieces of evidence it cited was that Boston Gas's O&M costs grew by 0.6% per annum (in inflation-adjusted terms) during the 1996-2002 term of the PBR plan, compared with 1.9% per annum (in inflation-adjusted terms) in the preceding 1990-96 period. The Department said that 1996 was the year the PBR plan was instituted and it inferred cause, not mere coincidence, for this change in behavior.

The cost trend analysis for Bay State was designed to replicate Boston Gas's cost trend analysis (which was undertaken in response to Department requests). The relevant PBR period for Bay State was end-1998 through 2003, when the rate freeze was in effect. The five years preceding the freeze were therefore 1993-1998. Our analysis

showed Bay State's O&M costs increased by an average of 3.9% in real terms from 1993-1998, but declined by 2.2% in real terms in the 1998-2003 period. The magnitude of the difference between Bay State's cost trends before and after the freeze took effect was therefore 6.1% (*i.e.* 3.9% - (-2.2%)) which was more than four times the magnitude of Boston Gas's comparable decline. Since the rate freeze took effect in late 1998, I concurred with the Department's reasoning that we can infer cause and not coincidence from this change in cost trends. I therefore concluded that Bay State responded at least as strongly as Boston Gas to the stronger incentives created by PBR. All else equal, achieving greater efficiency gains in an earlier PBR plan reduces a utility's ability to achieve additional productivity gains in a subsequent PBR plan. Taken in isolation, the evidence that Bay State responded at least as strongly as Boston Gas to the incentives of the previous PBR plan therefore supports a consumer dividend no greater than the 0.3% approved for Boston Gas.

The O&M cost study was designed to provide further evidence on Bay State's ability to achieve additional productivity gains. That is, even though Bay State responded very strongly to the incentives created by its previous PBR plan, it could be argued that if Bay State remained inefficient relative to industry norms when that PBR plan expired, it still has substantial opportunities to achieve additional productivity gains. The O&M cost study addressed this issue by examining Bay State's O&M cost performance under the rate freeze.

The Bay State econometric cost study also responded to, and rectified, the Department's concerns about the econometric study presented in DTE 03-40. Because of these concerns, the Department viewed the econometric benchmarking results in DTE 03-40 as "distorted" and concluded that they did not show that Boston Gas was a significantly superior cost performer. The econometric study for Bay State is designed to address these concerns and thereby provide a rigorous evaluation of Bay State's O&M cost performance that can aid the Department in determining an appropriate consumer dividend.

My analysis showed that Bay State's O&M costs were more than 14% below what would be expected for an average US gas distributor that faced the same operating conditions. This cost differential was statistically significant. This evidence further supports the conclusion that Bay State became very efficient under its previous PBR plan, so its consumer dividend should be no greater than the 0.3% approved for Boston Gas.

The empirical analyses undertaken for Bay State were accordingly developed within the framework established by DTE 03-40 and are similar to those undertaken by and for Boston Gas in that proceeding.

Bay State's cost trend analysis is essentially identical to that done by Boston Gas. My econometric study was similar to that done for Boston Gas, but expressly designed to eliminate the Department's concerns with the previous study. Overall, I believe the evidence shows that Bay State has no more, and perhaps fewer, opportunities to achieve additional productivity gains than Boston Gas did at the time DTE 03-40 was approved. The evidence therefore shows the 0.3% consumer dividend approved for Boston Gas should be viewed as an "upper bound" on the appropriate value of a consumer dividend for Bay State. For simplicity, I have recommended that the consumer dividend be set at this upper bound.



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Responsible: Lawrence R. Kaufmann, Consultant (PBR)

- DTE-4-32 Refer to Exh. BSG/LRK-1, at 10-12. Please:
- (a) explain the empirical basis for the proposed consumer dividend factor of 0.3 percent. Provide all documentation, workpapers, formula, computer printouts, etc. showing how the Company derived the 0.3 percent consumer dividend;
  - (b) what are the consumer dividend factors approved for regulated gas and electric distribution companies operating under price-cap PBR plans in Massachusetts and in other jurisdictions in recent years? Please indicate whether the utility is a gas, electric, or combined gas and electric utility, and whether the PBR plan is the company's first PBR plan or is an updated PBR plan.

Response:

- (a) Please see the response to DTE-4-27.
- (b) Below is a list of consumer dividends approved for North American energy utilities.

| <u>Company</u>             | <u>Consumer Dividend</u> | <u>Industry</u>    | <u>First PBR?</u> |
|----------------------------|--------------------------|--------------------|-------------------|
| Boston Gas (DPU 96-50)     | 0.5%                     | Gas distribution   | Yes               |
| Boston Gas (DTE 03-40)     | 0.3%                     | Gas distribution   | No                |
| Berkshire Gas              | 1.0%                     | Gas distribution   | Yes               |
| Blackstone Gas             | 0.39%                    | Gas distribution   | Yes               |
| Pacificorp (CA)            | 0%                       | Bundled power      | Yes               |
| Pacificorp (CA)-update     | 0%                       | Bundled power      | No                |
| Southern California Gas    | 0.8%                     | Gas distribution   | Yes               |
| Southern California Edison | 0.56%                    | Power distribution | Yes               |
| San Diego Gas and Electric | 0.55%                    | Power distribution | No                |
| San Diego Gas and Electric | 0.55%                    | Gas distribution   | No                |
| Ontario power distributors | 0.25%                    | Power distribution | Yes               |
| Union Gas (Ontario)        | 0.5%                     | Gas distribution   | Yes               |
| Average                    | 0.45%                    |                    |                   |

Although the Blackstone Gas did not explicitly state a value for a consumer dividend, given the Department determinations in DTE 03-40 I infer that the implicit consumer dividend agreed to in this plan was 0.39%;

this value is equal to the overall agreed X factor of 0.5% minus 0.11%, which is the sum of the productivity and inflation differentials determined in DTE 03-40. It should also be noted that there have been several index-based PBR plans in Maine. However, to my knowledge, these have all been determined by negotiated settlement with no explicit findings on TFP or inflation differentials in any plan, so it is not possible to infer values for consumer dividends.

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DTE-4-33 Refer to Exhs. BSG/LRK-1, at 12-13 and BSG/LRK-2, at 7-9. Please:

- (a) provide all documentation, workpapers, formula, computer printouts, etc. regarding the Company's O&M Cost Trend Analysis;
- (b) calculate the annual dollar change in the Company's O&M costs (in nominal and real dollars) during the five-year rate freeze period (end-1998 through 2003) and the five-year period before the rate freeze took effect (1993-1998);
- (c) discuss the specific areas where the Company achieved cost reductions, cost containment, and efficiency gains during the five-year rate freeze period (end-1998 through 2003) relative to the five-year period before the rate freeze took effect (1993-1998);
- (d) give reasons for the slower growth of O&M costs during the rate freeze period compared to the period before the rate freeze took effect;
- (e) indicate whether the O&M costs used in the cost trend analysis before and during the rate freeze period included only Bay State-specific costs or included also costs from NiSource corporate services and/or other Bay State affiliates;
- (f) break down the Company's O&M costs into its various components and calculate the average annual growth rate (in nominal and real dollars) for each component before and during the rate freeze period. Present the results in tabular and graphic forms. Provide all documentation, workpapers, formula, computer printouts, etc. showing how the calculations were done;
- (g) what conclusions or inferences can the Company draw from the analysis in (a)-(f) above?

Response:

- (a) All such documentation appears in Table One and Figure One in of Exhibit BSG/LRK-2. The corresponding Excel files are attached.
- (b) In nominal dollars, Bay State's O&M costs changed by an average of \$3,951,409 annually between 1993 and 1998, and by an average of -\$426,656 annually between 1998 and 2003. In constant dollars, Bay State's O&M costs changed by an average of \$2,855,363 annually between 1993 and 1998, and by an average of -\$1,942,570 annually between 1998 and 2003.
- (c) The information in Table One in Exhibit BSG/LRK-2 shows the following average annual changes in O&M cost by cost category.

| <b>Operation &amp; Maintenance Expenses - Nominal</b> |                             | <u>1993-98</u> | <u>1998-2003</u> |
|---|-----------------------------|----------------|------------------|
| (850-854)   | TOTAL T&D EXPENSE           | 1,673,314      | -71,223          |
| (901-905)   | TOTAL CUSTOMER ACCT EXPENSE | -302,917       | -825,443         |
| (911-916)   | TOTAL MKG SERVICES EXPENSE  | -70,140        | -499,774         |
| (920-932)   | TOTAL A&G EXPENSE           | 2,651,151      | 969,783          |

| <b>Operation &amp; Maintenance Expenses - Real</b> |                             |           |          |
|--|-----------------------------|-----------|----------|
| (850-854)  | TOTAL T&D EXPENSE           | 1,475,192 | -465,587 |
| (901-905)  | TOTAL CUSTOMER ACCT EXPENSE | -556,573  | -984,812 |
| (911-916)  | TOTAL MKG SERVICES EXPENSE  | -132,494  | -523,519 |
| (920-932)  | TOTAL A&G EXPENSE           | 2,069,238 | 31,348   |

The annual change in O&M costs was clearly lower in all categories in the 1998-2003 period compared with the 1993-98 period. Indeed, for T&D expenses, customer accounts expenses and marketing expenses, annual O&M costs declined in both real and nominal terms over the rate freeze period; the decline in inflation-adjusted terms is naturally greater.

The table below presents this same information, except in (arithmetic) percentage change terms.

| <b>Operation &amp; Maintenance Expenses - Nominal</b> |                             | <u>1993-98</u> | <u>1998-2003</u> |
|---|-----------------------------|----------------|------------------|
| (850-854)   | TOTAL T&D EXPENSE           | 12.2%          | -0.3%            |
| (901-905)   | TOTAL CUSTOMER ACCT EXPENSE | -2.4%          | -7.3%            |
| (911-916)   | TOTAL MKG SERVICES EXPENSE  | -2.2%          | -17.8%           |
| (920-932)   | TOTAL A&G EXPENSE           | 7.4%           | 2.0%             |

| <b>Operation &amp; Maintenance Expenses - Real</b> |                             |       |        |
|--|-----------------------------|-------|--------|
| (850-854)  | TOTAL T&D EXPENSE           | 9.5%  | -2.0%  |
| (901-905)  | TOTAL CUSTOMER ACCT EXPENSE | -3.9% | -8.4%  |
| (911-916)  | TOTAL MKG SERVICES EXPENSE  | -3.7% | -18.0% |

|           |                   |      |      |
|-----------|-------------------|------|------|
| (920-932) | TOTAL A&G EXPENSE | 5.1% | 0.1% |
|-----------|-------------------|------|------|

Comparing the 1993-98 and 1998-2003 trends, it is clear that cost savings have been achieved across the board. However, the biggest savings have been in T&D expenses (a -11.6% difference between the pre-freeze and post-freeze spending trends in real terms) and marketing expenses (a -14.3% difference between the pre-freeze and post-freeze spending trends in real terms). The differences between the customer account and A&G expense trends (in real terms) are -4.6% and -5.0%, respectively.

- (d) The testimony of Mr. Stephen Bryant presents a number of reasons why Bay State's O&M cost trends declined during the rate freeze period.
- (e) The O&M costs above include payments from Bay State to NiSource.
- (f) See the second set of tables presented in response to part (c). The relevant calculations are included in the attached Excel file.
- (g) I believe this information clearly demonstrates that Bay State responded positively to the incentives created by the rate freeze and achieved significant cost savings during the freeze.

COMMONWEALTH OF MASSACHUSETTS  
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY

RESPONSE OF BAY STATE GAS COMPANY TO THE  
FOURTH SET OF INFORMATION REQUESTS FROM THE D.T.E.  
D. T. E. 05-27

Date: May 31, 2005

Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-37 Refer to Exh. BSG/LRK-1, at 7-8. Please explain the differences, if any, between a "rate freeze plan", a "performance-based regulation plan", and a "rate indexing performance-based regulation plan".

Response: A performance-based regulation plan is a generic term describing alternative approaches to traditional cost of service regulation that are designed to create stronger performance incentives for the regulated utility. Other commonly used terms synonymous with performance-based regulation are "incentive regulation" and "alternative regulation."

A rate freeze is a plan that sets a utility's rates at a specific level for a known period of time. The rate freeze can apply to certain components of retail rates, such as gas distribution tariffs, and not others, like the cost of gas.

A rate indexing performance-based regulation plan adjusts regulated rates or revenues according to a formula that uses one or more economic indexes. The formula typically has an inflation measure that is measured by an index of economy-wide inflation or input price trends for the regulated industry, and an X factor that is calibrated using indexes of total factor productivity growth for the utility industry and (depending on the application) the overall economy.

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Date: May 31, 2005

Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-39 Refer to Exh. BSG/LRK-1, at 7-8 and 11-12. If Bay State's "situation is analogous to Boston Gas Company's at the expiration of its initial PBR plan", and the Company, "like Boston Gas Company, is effectively updating a type of performance-based regulation plan", as the Company has argued, would that not justify a term of ten-years for the Company's proposed PBR plan so that it is consistent with recent Department precedents in Boston Gas Company, D.T.E. 03-40 and Berkshire Gas Company, D.T.E. 01-56?

Response: Not necessarily. It is true that a ten-year PBR plan term was approved for Boston Gas after its original PBR plan expired. However, the 10-year term for Berkshire included an extended rate freeze period followed by a period of index-based price adjustments, with the total term for the two periods summing to 10 years. Bay State's five-year rate freeze is expiring, so if this is followed by a five-year indexing period, Bay State will have been subject to PBR for a total of 10 years. This is analogous to the Berkshire PBR plan, although the fractions of the plan term accounted for by the rate freeze would differ between Bay State and Berkshire. It should also be noted that the most recently approved PBR plan in Massachusetts is for Blackstone Gas, and this plan has a five-year term.

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D. T. E. 05-27

Date: May 31, 2005

Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-53      Refer to Exh. LRK-1, at 17. Please define the meaning of "incremental costs" as is being used in this statement regarding the applicability of the PCI formula.

Response:      The term "incremental costs" in BSG/LRK-1 at 17 does not refer to the PCI formula at all. Rather, "incremental costs" here means the costs associated with eligible facilities that Bay State replaced in the previous year. A fuller description of these costs and how they will be recovered through the SIR adjustment mechanism appears in the testimony of Joseph Ferro.



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D. T. E. 05-27

Date: May 31, 2005

Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-54      Refer to Exh. LRK-2, at 7. Does not the finding that Bay State's O&M cost trend "declined sharply while it was under the price freeze compared with the O&M cost trajectory before the freeze took effect" support the imposition of a rate freeze, rather than the adoption of a price cap PBR plan? Please explain.

Response:      No. The fact that Bay State's O&M cost trend declined sharply under the rate freeze indicates that the freeze was an effective form of PBR that promoted efficient behavior, but rate freezes are not sustainable for gas distributors in the long run. Unit costs are rising in the gas distribution industry, and these cost pressures will ultimately require rate relief. Rate freezes do not allow gas distribution base rates to rise to compensate for unavoidable unit cost increases. However, a properly calibrated rate indexing formula allows gas distribution prices to reflect changes in unit costs for the gas distribution industry. This encourages distributors to continue to pursue cost efficiencies, to the ultimate benefit of consumers, while still allowing gradual rate changes that reflect underlying cost pressures in the industry.

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Date: May 31, 2005

Responsible: Lawrence R. Kaufmann, Consultant (PBR)

DTE-4-57      Refer to Exh. LRK-2, at 24. Please indicate the degrees of freedom under which the t-statistic was assessed. Indicate also the significance cut off level for "T" with the degrees of freedom employed in the first test.

Response:      There were 400 degrees of freedom. At the 5% significance level, the critical value for the t statistic with 400 degrees of freedom (two-tailed test) is 1.96.